Southern Pine BEETLE NEWS

No. 17, February 1980

Kisatchie National Forest Initiates SPB Hazard Rating

Pine stands on the Kisatchie National Forest can now be rated by their relative susceptibility to southern pine beetle attack. Pete Lorio, with the Southern Forest Experiment Station, developed these criteria:

A. Stands consisting principally of loblolly pine, shortleaf pine, loblolly pine-hardwood, or shortleaf pine-oak will have a high or medium hazard classification if they have the following characteristics:

Total Stand Height (ft)	High Risk	Medium Risk
	Basal Area (ft^2/acre)	
55-65		
66-75	> 90	80-90
76-105	> 90	70-90
106+	> 100	70-100

B. Stands consisting principally of slash pine, longleaf pine, or bottomland-longleaf pine will have a medium hazard classification if they have the following characteristics:

Total Stand Height (ft)	Basal Area (ft^2/acre)
66-75	> 80
76-105	> 90
106+	> 100

Using these criteria, foresters on the Kisatchie National Forest can now consider the potential for SPB losses in their prescriptions for silvicultural treatments and cutting priorities.

Loblolly Pine Stand Models Compared

What is the best model for estimating yields of a loblolly pine plantation? To answer this question, researchers developed three stand models from data collected in old-field plantations in Virginia.

All three models—multiple regression, diameter distribution, and individual-tree simulation—provide accurate yield estimates and are free from prediction bias due to stand conditions. Researchers discovered, though, that the regression and diameter distribution models were more precise than the individual-tree simulation model.

The three models were evaluated and compared with independent data on the basis of merchantable cubic-foot yield estimates. Selection of the best model depends upon the amount of stand detail desired and the management practices to be evaluated.

DANIELS, R. F., H. E. BURKHART, and M. R. STRUB.
1979. Yield estimates for loblolly pine plantations. J. For. 77(9):581-583, 586.

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Air and Ground Forces Size Up Beetle Populations

Using both aerial and ground survey techniques, Arkansas researchers estimated the SPB populations on 800 ha (1,976 acres) of timber. The aerial survey quickly determined the number, size, and location of infested spots. Aerial photographs with the spot locations were given to crews responsible for locating the spots on the ground. Then during the ground survey, researchers collected data for each tree, such as its species, crown color, and stage of beetle development and diameter at breast height.

Following the aerial and ground surveys, investigators sampled trees from actively infested spots to obtain density estimates of the various SPB life stages per unit area of infested bark. The numbers of parasites and predators were recorded also.

Why did the researchers conduct such an intensive study? Their primary purpose was to use the methodology in situations where reliable estimates of damage and beetle numbers are required, such as pre- and postcontrol evaluations. The approach provides SPB absolute density at the area level, but it can be modified for large individual spots.

STEPHEN, F. M., and H. A. TAHA.
1979. Area-wide estimation of southern pine beetle populations. Environ. Entomol. 8:850-855.

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Research, Applications Highlighted in SPB Publication

A recent Program-sponsored publication, "Southern pine beetle research, applications, and implementation activities for the southern forestry community," is now available for distribution. More than 50 people from 8 SPB technology transfer teams contributed to the brochure, which highlights how to deal more effectively with the SPB.

The teams reviewed the state of knowledge in each area, identified additional research and application needs, and proposed ways for demonstrating, testing, and implementing the research and application results. They recommended followup activities to move the technology closer to use by pest control specialists and resource managers.

Copies of the brochure may be obtained from the SPB Program, 2500 Shreveport Highway, Pineville, LA 71360.

Logistic Probability Function Used to Estimate SPB Outbreaks

A logistic probability function has been used to predict SPB outbreak probability based on site, stand, and insect population variables. The method predicts SPB infestation incidence in terms of the risk of outbreak in a forest stand.

The model's continuous measure of incidence can be divided into categories. The probabilities indicate the chance of outbreak, even in low-susceptibility stands, and may be used in more sophisticated decision guideline models, such as forest stand simulators. The probabilities can be combined with outbreak severity estimates for calculation of expected losses.

The model requires a fairly large data set. Also, accurate weight estimates must compensate for data sampled with unequal probabilities.

DANIELS, R. F., W. A. LEUSCHNER, S. J. ZARNOCH, H. E. BURKHART, and R. R. HICKS.
1979. A method for estimating the probability of southern pine beetle outbreaks. For. Sci. 25(2):265-269.

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Host Susceptibility, Beetle Numbers Key to SPB Success

To increase knowledge of SPB dynamics in Texas, researchers sampled loblolly pines before and after attack over a 3-year period to determine host characteristics associated with southern pine beetle activity. Diameter and average bark thickness at 2 m, total tree height, recent growth, infested bole height, and other host variables were

measured. Investigators studied several beetle variables including attacking adult density, egg density, and generation survival.

Researchers analyzed the data using the stepwise regression analysis program of the Statistical Analysis System (SAS). Host characteristics and SPB life stages were used as independent variables. The date of peak attack was added as a variable, but it showed no seasonal effect.

When only the tree's physical characteristics were considered, diameter became the most important variable, but it diminished in importance when the beetle's life stages were considered. Researchers explain this change as expected since the density of a life stage is closely related to the stage directly preceding or following it.

Researchers discovered that attack density was correlated with at least two variables—the population of beetles available and the susceptibility of the host. When populations are high, host susceptibility becomes a more important factor.

FARGO, W. S., R. N. COULSON, J. A. GAGNE, and J. L. FOLTZ.
1979. Correlation of southern pine beetle attack density, oviposition, and generation survival with host characteristics and preceding beetle life stages within the host. Environ. Entomol. 8:624-628.

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Tough for How Long?

If pine beetles have killed your tree and you plan to sell it for lumber, you have to move quickly. Research indicates greatest loss in lumber toughness occurs during the first warm season following the tree's death, regardless of the time of foliage fade. Little loss occurs in subsequent warm periods.

This Virginia study used 1,200 small, clear specimens from healthy and beetle-killed loblolly and shortleaf pines. The specimens were harvested 2, 12, and 20 months after foliage fade. Lumber obtained from the beetle-killed pines was identical to that from healthy pines except for early decay and associated sap stain. Specimens from butt logs were consistently tougher than those from upper logs.

Researchers conclude that the reduction of toughness in small, clear specimens cannot be used to predict degradation of wood in full size, graded lumber. Additional tests should be run before any changes are made in design stress or grading procedures.

SINCLAIR, S. A., T. E. MCLAIN, and G. IFJU.
1979. Toughness of sap stained southern pine salvaged after beetle attack. Wood & Fiber 11(1):66-72.

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A Note

The original description of the southern pine beetle was done by C. Zimmermann.

C. ZIMMERMANN.
1868. Synopsis of the Scolytidae of America north of Mexico. Trans. Amer. Entomol. Soc. 2:141-149.

Erratum

In the proceedings of the Many, La., symposium, *Evaluating Control Tactics for the Southern Pine Beetle,* the following corrections should be made in the paper by Stephen and Taha, entitled "Tree mortality, infested bark area, and beetle population measurements as components of treatment evaluation procedures on discrete forest management units":

1. p. 48, 2nd column, line 57:
   "The model IBA = -650.60 +55.230 d.b.h. ..." (insert negative symbol).
2. p. 49, 2nd column, line 6:
   "IBA = -1335.4 +43.74 (d.b.h. __Class) + ..." (insert negative symbol).

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ADDRESS CORRECTION REQUESTED

National Agricultural Library
TIS/SEA/USDA
Exchange Unit, Room 004
Beltsville, MD 20705

SPB Modeling Symposium

Research on modeling of SPB populations, life processes, trend prediction, and timber mortality was synthesized at a symposium held Feb. 20 to 22, 1980, at the Great Smokies Hilton in Asheville, N.C.

Fred Stephen, Team Leader of the Sampling and Predictive Models Technology Transfer Team, announced his goal: to achieve peer group communication with knowledgeable and interested scientists. The technical nature of the subject matter suggested that scientists are the most appropriate audience for these discussions.

For further details or a copy of the symposium proceedings to be published in the summer of 1980, contact the SPB Program, 2500 Shreveport Highway, Pineville, LA 71360.

Other Publications of Interest

Anderson, W. W., C. W. Berisford, and R. H. Zimmich.
1979. Genetic differences among five populations of the southern pine beetle. Ann. Entomol. Soc. Amer. 72:323-327.
Department of Entomology, University of Georgia, Athens 30602

Leuschner, W. A., D. G. Shore, and D. W. Smith.
1979. Estimating the southern pine beetle's hydrologic impact. Bull. Entomol. Soc. Amer. 25(2):147-150.
Department of Forestry, Virginia Polytechnic Institute and State University, Blacksburg 24061

Mann, J. E., G. L. Curry, and P. J. H. Sharpe.
1979. Light interception by isolated plants. Agric. Meteorol. 20:205-214.
Department of Industrial Engineering, Texas A. & M. University, College Station 77843

Reed, D. D.
1979. Estimating region-wide damages caused by the southern pine beetle. M.S. thesis. Va. Polytech. Inst. & State Univ., Blacksburg. 90 p.
Department of Forestry, Virginia Polytechnic Institute and State University, Blacksburg 24061

Thatcher, R. C., J. E. Coster, and T. L. Payne.
1978. Southern pine beetles can kill your ornamental pine. 15 p. U.S. Dep. Agric. For. Serv., Home & Garden Bull. 226, Comb. For. Pest Res. Develop. Prog., Pineville, La.
SPB Program, 2500 Shreveport Highway, Pineville, LA 71360.

White, J. D., and J. A. Richmond.
1979. Two olfactometers for observing orientation of the southern pine beetle to host odors. J. Ga. Entomol. Soc. 14:99-106.
Southeastern Forest Experiment Station, Research Triangle Park, NC 27709

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